

**[0025]** FIG. 10 is a schematic drawing showing the movement of folding the flexible electronic device according to the third embodiment of the flexible electronic device.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

**[0026]** The advantages and innovative features of the disclosure will become more apparent from the following detailed descriptions when taken together with the accompanying drawings.

**[0027]** Please refer to FIG. 1 to FIG. 4b regarding the first embodiment of the flexible electronic device, wherein FIG. 1 illustrates the hardware structure of the first embodiment of the flexible electronic device; FIG. 2 is a schematic drawing illustrating an opened state of the present disclosure; FIG. 3 is a schematic drawing showing the movement of folding the flexible electronic device; FIG. 4a is a schematic drawing illustrating a front side of the flexible electronic device while the flexible electronic device is in a folded state; and FIG. 4b is a schematic drawing illustrating a rear side of the flexible electronic device while the flexible electronic device is in a folded state.

**[0028]** As shown in FIG. 1 and FIG. 2, the hardware structure of the first embodiment of the flexible electronic device mainly comprises: a flexible display module 10, a button module 20, and a processing unit 30. The flexible electronic device 1 of the present disclosure further comprises a substrate 12 and at least one folding device 13, wherein the flexible display module 10 is mounted on the substrate 12. The folding device 13 is used for folding the flexible display module 10 and leading the substrate 12 to fold correspondingly. Therefore, the flexible electronic device 1 can be opened or folded such that a plurality of operating modes can be operated accordingly. As shown in FIG. 2, information such as characters or graphics can be displayed on a main display area 11 of the flexible display module 10. In this embodiment, the flexible display module 10 is an e-paper display, and the button module 20 is mounted beneath the main display area 11. The processing unit 30 for implementing operation of the flexible electronic device 1 is electrically connected to the button module 20. The processing unit 30 can be a software program or an electrical circuit device with software programs which is capable of implementing various operations according to operating systems or application software installed in the flexible electronic device 1. It is noted that the present disclosure is not limited to the abovementioned embodiments.

**[0029]** As shown in FIG. 3, while the flexible display module 10 is being folded by rotating the hinge of the folding device 13, an A side of the flexible display module 10 and a B side of the flexible display module 10 can move closer to each other until the A side of the flexible display module 10 contacts the B side of the flexible display module 10 such that a folded state, illustrated in FIG. 4a and FIG. 4b, is formed. While the electronic device 1 is in the folded state, the folding device 13 can be used as a dividing line for dividing the main display 11 of the flexible display module 10 into a plurality of sub-display zones. It is noted that although the main display 10 in FIG. 3 is divided into two sub-display zones, namely sub-display zone 111 and sub-display zone 112, the present disclosure is not limited to this embodiment. In fact, the flexible display module 10 can be divided into multiple sections, the number of which depends on the quantity and location of the folding devices 13. Therefore, the number of

the plurality of sub-display zones may vary. It should be noted that FIG. 3 is used for illustration only. After the flexible electronic device 1 is in the folded state, a front side of the flexible electronic device 1 (as shown in FIG. 4a) and a rear side of the flexible electronic device 1 (as shown in FIG. 4b) both have display screens. In this embodiment, the button module 20 is mounted on the front side of the flexible electronic device 1, and the button module 20 allows users to manipulate the flexible electronic device 1 for uses such as sending emails or displaying graphs (as shown in FIG. 4a). The rear side of the flexible electronic device 1 is used for displaying graphics, but the operating modes of the present disclosure are not limited to the above-mentioned embodiments.

**[0030]** Please refer to FIG. 5 to FIG. 9b regarding the second embodiment of the flexible electronic device, wherein FIG. 5 illustrates the hardware structure of the second embodiment of the flexible electronic device; FIG. 6 is a schematic drawing illustrating an opened state of the present disclosure; FIG. 7 is a schematic drawing illustrating a site of a button module of the flexible electronic device; FIG. 8 is a schematic drawing illustrating the sites of a sensing device and a processing unit of the flexible electronic device; FIG. 9a is a schematic drawing illustrating a front side of the flexible electronic device while the flexible electronic device is in a folded state; and FIG. 9b is a schematic drawing illustrating a rear side of the flexible electronic device while the flexible electronic device is in a folded state.

**[0031]** In the second embodiment of the present disclosure, the present disclosure provides a flexible electronic device 1a that can be operated in an e-reader mode or an audio communication mode. In order to operate in the audio communication mode, the flexible electronic device 1a has an audio device 40, which is the most distinguishable difference between the flexible electronic device 1 and the flexible electronic device 1a. As shown in FIG. 5, the audio device 40 is electrically connected to the processing unit 30 for facilitating making phone calls or playing music. As shown in FIG. 6, when the flexible display module 10 is in the opened state, the flexible electronic device 1a is operated in an e-reader mode and the processing unit 30 implements corresponding operations of the e-reader mode. When the flexible display module 10 is in the folded state, the flexible electronic device 1a is operated in an audio communication mode and the processing unit 30 implements corresponding operations of the audio communication mode. While the flexible electronic device 1a is operating in the audio communication mode, users can receive or send sounds or voice through the audio device 40. In this embodiment, the audio device 40 comprises a sound emission device such as an audio speaker and a sound reception device such as a microphone. It is noted that although the audio device 40 is mainly used in the audio communication mode, the present disclosure is not restricted to that. The audio device 40 can also be used in the e-reader mode to enhance the applicability of the present disclosure.

**[0032]** As shown in FIG. 7, the substrate 12 is located beneath the flexible display module 10, and the folding device 13 is mounted on the substrate 12. In this embodiment, the folding device 13 is located in the middle of the substrate 12 in terms of length; therefore, while the flexible electronic device 1a is in the folded state, the main display area 11 of the flexible display module 10 is divided into two sub-display zones: sub-display zone 111 and sub-display zone 112. The sub-display zone 111 is used for displaying information such